Investigating Explainability of Generative AI for Code through Scenario-based Design

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Abstract

What does it mean for a generative AI model to be explainable? The emergent discipline of explainable AI (XAI) has made great strides in helping people understand discriminative models. Less attention has been paid to generative models that produce artifacts, rather than decisions, as output. Meanwhile, generative AI (GenAI) technologies are maturing and being applied to application domains such as software engineering. Using scenario-based design and question-driven XAI design approaches, we explore users' explainability needs for GenAI in three software engineering use cases: natural language to code, code translation, and code auto-completion. We conducted 9 workshops with 43 software engineers in which real examples from state-of-the-art generative AI models were used to elicit users' explainability needs. Drawing from prior work, we also propose 4 types of XAI features for GenAI for code and gathered additional design ideas from participants. Our work explores explainability needs for GenAI for code and demonstrates how human-centered approaches can drive the technical development of XAI in novel domains.